IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

CARNEGIE INSTITUTION OF WASHINGTON and M7D CORPORATION,	)	
Plaintiffs,	)	
v.	)	Civil Action No. 1:20-cv-00200-JSR
FENIX DIAMONDS LLC,	)	Honorable Jed S. Rakoff
Defendant.	)	

DEFENDANT FENIX DIAMONDS LLC'S RESPONSES TO PLAINTIFFS CARNEGIE INSTITUTION OF WASHINGTON AND M7D CORPORATION'S STATEMENT OF MATERIAL FACTS IN SUPPORT OF THEIR OPPOSITION TO DEFENDANT'S MOTION FOR SUMMARY JUDGMENT

[redacted]

I. BACKGROUND

A. The Patents-in-Suit

1. U.S. Patent No. 6,858,078 (the "'078 patent") and U.S. Patent No. RE41,189 (the "'189 patent") disclose methods for producing laboratory-grown diamonds. Kopinski Decl.[1] Ex. 2 ('078 patent); Kopinski Decl. Ex. 3 ('189 patent). [footnote omitted]

RESPONSE: Undisputed.

2. Methods for producing laboratory-grown diamonds include high-pressure, high-temperature ("HPHT") and chemical vapor deposition ("CVD"). Chajon Decl.[2] Ex. 1, Expert Report of Michael Capano, Ph.D. Regarding Infringement of U.S. Patent Nos. 6,858,078 ("Capano Rep.") ¶¶ 77, 81. [footnote omitted]

RESPONSE: Undisputed.

3. Microwave plasma CVD ("MPCVD") uses microwave generators as a power source and relies on process controls that manipulate temperature, pressure, and gas-phase chemistry to grow high-quality diamonds. *See* Chajon Decl. Ex. 2, September 1–2, 2020 Russell J. Hemley Deposition Transcript ("Hemley Dep. Tr.") at 75:18–76:16.

RESPONSE: Undisputed that MPCVD reactors use microwave generators as a power source and rely on process controls that affect temperature and pressure. Disputed that all MPCVD processes grow high-quality diamonds. For example, Dr. Capano testified that [redacted] Second Kopinski Decl. Ex. 16 (Capano Dep. Tr). at 177:23–178:2. Disputed because the term "manipulate" is ambiguous. For example, there is no evidence that [redacted]

[redacted]

[redacted]

VIEW 10 / NV971

Disputed that Nouveau's diamonds are [redacted] The first six batches Nouveau photographed from a side perspective appear below. All are accused of infringing. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 25.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

4. MPCVD diamonds are grown in a deposition chamber where air is removed to perform chemical vapor deposition. Kopinski Decl. Ex. 2 ('078 patent) at 4:12–21; Chajon Decl. Ex. 3, Expert Report of Karen K. Gleason, Ph.D. Regarding Validity of U.S. Patent Nos. 6,858,078 and RE41,189 ("Gleason Rep.") ¶ 58; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 64.

RESPONSE: Undisputed.

5. A diamond "seed" is placed in the chamber. Kopinski Decl. Ex. 2 ('078 patent) at 3:65–4:21; 4:56–67; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 58; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 64.

RESPONSE: Undisputed that MPCVD can occur on a diamond seed. Fenix lacks information sufficient to determine whether a seed must always be used and therefore disputes on this basis.

6. Gases are pumped into the chamber and microwave power is applied, igniting the plasma. Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 58; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 64.

RESPONSE: Disputed that plasma ignites. Otherwise, undisputed.

[redacted]

7. Pressure and microwave power are then incrementally increased until growth conditions are reached. Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 58; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 64.

RESPONSE: Undisputed that pressure and microwave power can be controlled during MPCVD. Disputed as unsupported by the cited evidence, particularly to the extent the cited evidence does not explain what "incrementally" means or prove that incremental control is necessary.

8. The properties of these laboratory grown diamonds depend on these types of manufacturing process details. Chajon Decl. Ex. 1 (Capano Rep.) ¶¶ 83, 93, 95.

RESPONSE: Defendant objects to this proposed fact as vague, in particular as to both instances of the term "these," as no predicate has been provided in either case. Further, disputed as unsupported by the cited evidence. Undisputed that the manufacturing process (including, but not limited to, growth, cutting, annealing, polishing) governs the properties of lab-grown diamonds.

9. Lab-grown diamonds may have a single crystal (monocrystalline) or may include many crystals (polycrystalline). Chajon Decl. Ex. 1 (Capano Rep.) ¶¶ 86, 96–100.

RESPONSE: Undisputed.

10. Monocrystalline diamonds are commonly used as gemstones, while polycrystalline diamonds are typically used in industrial applications. Kopinski Decl. Ex. 4 (Capano Rep.) ¶ 101.

RESPONSE: Disputed as unsupported by the cited evidence, particularly to the extent that the cited evidence does not state that monocrystalline diamonds are commonly used as gemstones. Further, disputed given that, for example, despite acknowledging that diamonds are

[redacted]

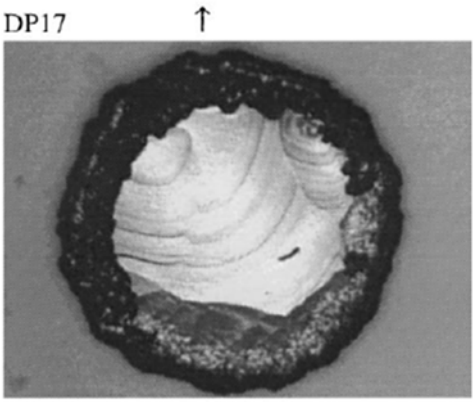
used as gemstones (Kopinski Decl. Ex. 2 ('078 patent) at 1:24), the '078 patent only describes its single-crystal diamond as being useful for industrial purposes (*id*. at 14:49–52). This is likely due to its tiny size (4.2x4.2.0.7mm or about 0.22 carats) and undesirable yellow/brown color. First Kopinski Decl. Ex. 8 (Yan 2002) at 12524 (incorporated by reference into '078 patent); Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rpt.) at ¶¶ 447–448. Furthermore, [redacted] First Kopinski Decl. Ex. 5 (Nouveau Affidavit) ¶¶ 2, 5.O; Second Kopinski Decl. Ex. 18 August 19, 2020 Deposition Transcript of Naman Parikh (Naman Parikh Dep. Tr.) at 50:25–51:20.

B. U.S. Patent No. 6,858,078

11. CVD methods that could produce "small quantities of diamond" were known in the art, but the known processes resulted in slow growth rates. Kopinski Decl. Ex. 2 ('078 patent) at 1:30–51; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 56; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 62.

RESPONSE: Disputed. For example, Yan and Vohra grew single-crystal domain at 32 micrometers per hour via MPCVD at a growth temperature of 1350 °C and a pressure of 200 torr. Second Kopinski Decl. Ex. 19 J. Michael Pinneo, Ph.D Opening Report on Invalidity (Pinneo Invalidity Rep.) ¶ 135 (sample DP17). The only difference between sample DP17 and the recited claims is that sample DP17 is not a single-crystal diamond (like [redacted] and no temperature gradient control was performed. Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 66:20–23 (testifying that to practice the claims, "one needs to directly measure the temperature gradients [at least during the development stage]"; Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 73:13–21 (testifying that a diamond with non-monocrystalline material about its edge cannot be single-crystal under the Courts construction).

[redacted]



12. Prior to the ’078 patent, attempts to grow single-crystal diamond at higher rates were unsuccessful, resulting in, e.g., diamonds that were polycrystalline, had significant defects or stresses. Kopinski Decl. Ex. 2 (’078 patent) at 1:52–61; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 56; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 62.

RESPONSE: Noted that this is an incorrect quote from the ’078 patent, which states that “Known higher-growth rate processes *only* produce or grow polycrystalline forms of diamond.” Kopinski Decl. Ex. 2 (’078 patent) at 1:52–54 (emphasis added). Disputed that the ’078 patent resolved this problem and disputed that the ‘078 patent includes any commercially useful technology. Further disputed as unsupported by the cited evidence, particularly insofar as paragraph 56 of the Gleason Report is directed towards enablement. Otherwise, undisputed.

13. The ’078 patent’s inventors—researchers at the Carnegie Institution of Washington—developed an approach enabling faster growth of substantially single-crystal diamonds (albeit, with a small degree of polycrystallinity). Kopinski Decl. Ex. 2 (’078 patent) at 13:38–14:7; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 57; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 63.

RESPONSE: Disputed. The ’078 patent’s listed inventors included Yogesh Vohra, who was affiliated with the University of Alabama at Birmingham, not with Carnegie Institution of Washington. First Kopinski Decl. Ex. 2 (’078 patent) at cover page; Chajon Decl. Ex. 1 (Capano

[redacted]

Rep.) ¶ 58. Disputed that the '078 patent enables diamond production. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) ¶¶ 1173–1222. Further disputed as unsupported by the cited evidence, particularly insofar as paragraph 57 of the Gleason Report is directed towards definiteness.

14. The '078 patent discloses a way to grow high-quality, single-crystal diamonds by enabling control over growth surface temperatures and growth surface temperature gradients. Kopinski Decl. Ex. 2 ('078 patent) at 6:51–54; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 59; Chajon Decl. Ex. 1 (Capano Rep.) ¶ 65.

RESPONSE: Disputed. The '078 patent does not enable high quality diamond growth. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) at ¶¶ 1173, 1180. The '078 does not enable control over growth surface temperature gradients. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) ¶¶ 1207–1209. Further disputed as unsupported by the cited evidence, particularly insofar as paragraph 59 of the Gleason Report is directed towards patent definiteness.

15. The '078 patent teaches that the temperature of the growth surface of the diamond should be controlled so that all temperature gradients (difference) across the growth surface are less than 20 °C. *See, e.g.*, Kopinski Decl. Ex. 2 ('078 patent) at Claim 1 ("controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20 °C"); Abstract ("controlling temperature of the growth surface such that all temperature gradients across the growth surface are less than 20 °C"), 2:66–3:5 ("a method for producing diamond includes controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20 °C and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth

[redacted]

surface"), 3:8–13 (same); *see also* Chajon Decl. Ex. 3 (Gleason Rep.) ¶¶ 59–61; Chajon Decl. Ex. 1 (Capano Rep.) ¶¶ 65–68).

RESPONSE: Disputed as unsupported by the cited evidence, particularly insofar as paragraphs 59-61 of the Gleason Report are directed towards either patent definiteness or a recitation of the filing, issue and expiration dates and listed inventors of the '078 patent. Otherwise, undisputed.

16. The '078 patent teaches that controlling the temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20° C results in substantially single-crystal diamonds, i.e., with only "a small degree of polycrystallinity." Kopinski Decl. Ex. 2 ('078 patent) at Abstract, 13:66–14:1.

RESPONSE: Disputed for inserting a claim construction that Plaintiffs proposed ("substantially single-crystal") and the Court rejected. Claim Construction Order (Dkt. No. 42) at 29. Disputed because the '078 patent teaches that zero non-monocrystalline material will grow if temperature gradients are successfully maintained at less than 20 °C. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 186 ("[The '078 patent] teaches that temperature gradients of less than 20° C are *necessary* to produce uniform growth over large diamonds.") (emphasis added); Kopinski Decl. Ex. 2 ('078 patent) at 6:48–54 ("Precise control over… growth surface temperature gradients *prevents the formation of polycrystalline diamond*.") (emphasis added); *id*. at 5:5–9 ("the distance D *can not* be so large as to prevent the heat-sinking effect of the [side-contact-holder] *that prevents the formation of twins or polycrystalline diamond* along the edges.").

17. The '078 patent explains various approaches for establishing, applying, and adjusting control parameters to limit the temperature "gradients" (difference) between any two

points on the growth surface to less than 20 °C. *See, e.g.*, Kopinski Decl. Ex. 2 ('078 patent) at 4:59–64, 6:17–25, 12:21–46; Chajon Decl. Ex. 3 (Gleason Rep.) ¶¶ 61–62.

> The ability to control all of the temperature gradients across the growth surface of the diamond **136** is influenced by several factors, including the heat sinking capability of the stage **124**, the positioning of the top surface of the diamond in the plasma **141**, the uniformity of the plasma **141** that the growth surface of the diamond is subjected to, the quality of thermal transfer from edges of the diamond via the holder or sheath **134** to the stage **124**, the controllability of the microwave power, coolant flow rate, coolant temperature, gas flow rates, reactant flow rate and the detection capabilities of the infrared pyrometer **142**.

Kopinski Decl. Ex. 2 ('078 patent) at 6:55–66; Chajon Decl. Ex. 3 (Gleason Rep.) ¶¶ 61–62.

RESPONSE: Disputed. The '078 patent teaches (including in this paragraph) that in addition to using a side-contact-holder and active temperature gradient measurements, it is necessary, but not sufficient, to control these factors. First Kopinski Decl. Ex. 2 ('078 patent) at 6:20–25; Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) ¶¶ 989, 1075–1080. The '078 patent is explicit that a side-contact holder is required. First Kopinski Decl. Ex. 2 ('078 patent) at 5:5–9 ("the distance D *can not* be so large as to prevent the heat-sinking effect of the sheath *that prevents the formation of twins or polycrystalline diamond* along the edges." The sheath contacts the "side surface of the diamond" and thus identifies a side-contact-holder. *Id*. at 47–50. Dr. Vohra testified that a side-contact-holder would be required, in his opinion, to maintain all temperature gradients under 10, 20, or 30°C. Second Kopinski Decl. Ex. 28 (Vohra Dep. Tr.) at 179:23–180:9. *See also* Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rpt.) at ¶¶ 978–1093. Further disputed as unsupported by the cited evidence, particularly insofar as paragraphs 61 and 62 of the Gleason Report are directed towards either a recitation of the filing, issue and expiration dates and listed inventors of the '078 patent or an alleged description of prior attempts to use MPCVD to grow diamonds.

[redacted]

18. By using these parameters to control the temperature of a growth surface, the inventors developed a system that could be used with larger seeds while reducing defects, e.g., polycrystallinity and "twinning." Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 63; Kopinski Decl. Ex. 2 ('078 patent) at 13:21–14:63.

RESPONSE: Disputed. The '078 patent is not enabled. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) ¶¶ 1173–222, at ¶ 1173. The inventors did not demonstrate possession of subject matter claimed by the '078 patent. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) ¶¶ 978–1172. Further disputed as unsupported by the cited evidence, particularly insofar as paragraph 63 of the Gleason Report does not mention the use of larger seeds or the reduction of defects, e.g., polycrystallinity and "twinning."

19. This allowed the inventors to grow larger single crystal diamond and "large, high quality diamonds with increased growth rates." Kopinski Decl. Ex. 2 ('078 patent) at 13:21–22; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 63.

RESPONSE: The term "large" is objected to for being vague. Disputed that the diamond grown in the '078 patent was large by any reasonable standard. The diamond grown was 4.2x4.2.0.7mm or about 0.22 carats and undesirable yellow/brown color. First Kopinski Decl. Ex. 8 (Yan 2002) at 12524 (incorporated by reference into '078 patent); Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 59:23–60:5. The diamond grown in the '078 patent was only suitable for industrial use. First Kopinski Decl. Ex. 2 ('078 patent) at 14:49–52; Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) at ¶¶ 1149–54. Accordingly, such diamonds are not "high quality diamonds." Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) at ¶¶ 1173, 1180. Undisputed to the extent that the '078 patent includes the quotation "large, high quality diamonds with increased [] growth rates." Kopinski Decl. Ex. 2 ('078 patent) at 13:21–22.

[redacted]

20. The ’078 patent describes various configurations for use in the claimed methods. For example, some systems use a holder that makes thermal contact with a side surface of the diamond. Kopinski Decl. Ex. 2 (’078 patent) at 2:45–56; Chajon Decl. Ex. 3 (Gleason Rep.) ¶¶ 88, 130–152.

RESPONSE: Disputed. All systems described in the ‘078 patent use a holder that makes thermal contact with a side surface of the diamond. First Kopinski Decl. Ex. 2 (’078 patent) at 2:26-65, 13:38-14:52, FIGS. 1, 2a, 2b, 3, 4a, 4b, 4c, 5-7. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rep.) ¶¶ 981–88. Further disputed as unsupported by the cited evidence, particularly insofar as paragraphs 88 and 130-152 of the Gleason Report are directed towards the prosecution history of the ‘189 patent (¶ 88) or whether certain prior art anticipates the ‘078 patent (¶¶ 130-152).

21. The ’078 patent describes configurations for use in the claimed methods that use a simple holder, such as a flat plate. Kopinski Decl. Ex. 2 (’078 patent) at 2:57–65, Chajon Decl. Ex. 3 (Gleason Rep.) ¶¶ 130–152.

RESPONSE: Disputed. Nowhere does the ’078 patent describe the holder as a “plate” or “flat.” First Kopinski Decl. Ex. 2 (’078 patent) at 2:57–65 (“In accordance with another embodiment of the present invention, a method for producing diamond includes positioning diamond in a holder, measuring temperature of a growth surface of the diamond to generate temperature measurements, controlling temperature of the growth surface with a main process controller using the temperature measurements such that all temperature gradients across the growth surface are least than 20° C., growing diamond on the growth surface and repositioning the diamond in the holder.”) Although Dr. Capano and Dr. Gleason argue that the ‘078 patent contemplated a flat plate, their reports do not identify any such teaching. Further disputed as

[redacted]

unsupported by the cited evidence, particularly insofar as paragraphs 130-152 of the Gleason Report are directed towards whether certain prior art anticipates the '078 patent.

22. The '078 patent issued on February 22, 2005, to Russell J. Hemley, Ho-kwang Mao, Chih-shiue Yan and Yogesh K. Vohra. Kopinski Decl. Ex. 2 ('078 patent), at cover page.

RESPONSE: Undisputed.

23. The patent contains 64 claims, six of which are asserted in the present litigation (claims 1, 6, 11, 12, and 16). Kopinski Decl. Ex. 2 ('078 patent); Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 3.

RESPONSE: Undisputed.

24. The asserted independent claims 1 and 12 of the '078 patent recite:

1. A method for diamond production, comprising: controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20° C.; and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface at a growth temperature in a deposition chamber having an atmosphere with a pressure of at least 130 torr.	**12**. A method for diamond production, comprising: controlling temperature of a growth surface of the diamond such that all temperature gradients across the growth surface are less than 20° C.; and growing single-crystal diamond by microwave plasma chemical vapor deposition on the growth surface at a temperature of 900–1400° C.

Kopinski Decl. Ex. 2 ('078 patent) at 14:64–15:4, 15:31–37.

RESPONSE: Undisputed.

C. U.S. Patent No. RE41,189

25. Laboratory-grown diamonds can have flaws limiting their use. Kopinski Decl. Ex. 3 ('189 patent) at 1:14–21, 2:7–9; Chajon Decl. Ex. 3, (Gleason Rep.) ¶ 65. These flaws may lead to single-crystal and polycrystalline CVD diamonds that "range from opaque to fully

[redacted]

transparent," even being "very dark" and "opaque to optical transmission." Kopinski Decl. Ex. 3 ('189 patent) at 1:12–21, 3:19–21; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 65.

RESPONSE: Disputed as unsupported by the cited evidence, particularly insofar as paragraph 65 of the Gleason Report is directed towards the '078 patent. Otherwise, undisputed.

26. While diamond suppliers attempted to improve natural and HPHT diamond properties with "annealing" processes, these processes often resulted in cracks, darkening, and even converting the diamond to graphite. Kopinski Decl. Ex. 3 ('189 patent) at 1:26–32, 2:29–44; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 65.

RESPONSE: Disputed. For example, Webb (Steven W. Webb & W.E. Jackson, *Synthetic Diamond Crystal Strength Enhancement Through Annealing at 50 kbar and 1500 °C*, 10 J. MATER. RES. 1700, 1700 (1995)) teaches that annealing synthetic single-crystal diamond at 1500 °C and 5GPa can be advantageous. *See, e.g.*, Second Kopinski Declaration Ex. 19 (Pinneo Invalidity Rpt.), at ¶¶ 1294-97, 1363–1382. Further disputed as unsupported by the cited evidence, particularly insofar as paragraph 65 of the Gleason Report is directed towards the '078 patent.

27. The '189 patent describes methods of improving the optical clarity of *single-crystal CVD* diamond (as opposed to natural and HPHT diamond) by subjecting it to HPHT annealing conditions, i.e., certain minimum temperatures and pressures. Applying high pressures and temperatures results in a more perfect diamond crystalline material, Kopinski Decl. Ex. 3 ('189 patent) at 2:29–50; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 66, and improves the diamond's optical, electrical, thermal, and mechanical properties, increasing its value. Kopinski Decl. Ex. 3 ('189 patent) at 1:10–12, 1:43–45, 1:61–65, 1:67–2:3, 2:29–34; Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 66.

[redacted]

RESPONSE: Undisputed that this is what the '189 patent purports to describe. Disputed that higher temperatures and pressures are inherently advantageous. *See* Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rpt.) at ¶ 105. Disputed that the '189 patent teaches how to improve the optical clarity of diamond other than subjecting the diamond to known temperature/pressure combinations. For example, Webb (Steven W. Webb & W.E. Jackson, *Synthetic Diamond Crystal Strength Enhancement Through Annealing at 50 kbar and 1500 °C*, 10 J. MATER. RES. 1700, 1700 (1995)) teaches annealing synthetic single-crystal diamond at 1500 °C and 5GPa, which anticipates every element of the subject matter in claim 1. *See, e.g.*, Second Kopinski Declaration Ex. 19 (Pinneo Invalidity Rpt.), at ¶¶ 1294-97, 1363–1382. Further disputed as unsupported by the cited evidence, particularly insofar as paragraph 66 of the Gleason Report is directed towards the '078 patent.

28. The '189 patent is a reissue of U.S. Patent 6,811,610 ("the '610 patent"), filed on June 3, 2002, and issued on November 2, 2004. Kopinski Decl. Ex. 3 ('189 patent) at cover page. The '189 patent, in turn, issued on April 6, 2010, to Wei Li, Russel J. Hemley, Ho-kwang Mao, and Chih-shiue Yan. *Id*.

RESPONSE: Undisputed.

29. The '189 patent contains seven claims, two of which Plaintiffs have asserted in this case (claims 1 and 2). Independent claim 1 recites a method "to improve the optical clarity of CVD diamond where the CVD diamond is single crystal CVD diamond, by raising the CVD diamond to a set temperature of at least 1500° C. and a pressure of at least 4.0 GPA outside of the diamond stable phase." Kopinski Decl. Ex. 3 ('189 patent) at 4:10–14.

RESPONSE: Undisputed that Plaintiffs originally asserted these claims. Disputed that Plaintiffs continue to assert these claims. First Kopinski Decl. Ex. 10 (Jarosz Rep.) at 2 n.2

[redacted]

(stating that the '189 patent is "no longer at issue"); First Kopinski Decl. Ex. 4 (Capano Rep.) ¶¶ 1–3, 153 (stating that the '189 patent "not asserted against Fenix").

D. The Present Litigation

30. Defendant Fenix Diamonds LLC ("Fenix") sells laboratory grown diamonds manufactured by Nouveau Diamonds LLP. Chajon Decl. Ex. 4, Transcript of July 22, 2020 Amit Mehta Deposition ("Mehta Dep. Tr.") 40:1–16.

RESPONSE: Undisputed.

31. Fenix "acquires its diamonds produced by Nouveau Diamonds LLP." Chajon Decl. Ex. 4 (Mehta Dep. Tr.) 40:1–16.

RESPONSE: Undisputed.

32. In January 2020, Plaintiffs filed suit against inter alia Fenix, alleging willful infringement of the asserted patents through the manufacture, sale, and importation of diamonds made using the patented processes. ECF No. 1.

RESPONSE: Undisputed.

33. After the Court entered a schedule (ECF No. 18), the parties filed competing Markman submissions, disputing, among other things, the meaning of the terms "single-crystal diamond" ('078 patent) and "single crystal CVD diamond" ('189 patent). *See* ECF No. 42 (Opinion and Order) at 27–28.

RESPONSE: Undisputed.

34. During claim construction, Plaintiffs and Fenix offered constructions for the term "single-crystal diamond" that allowed for some degree of polycrystallinity. *See* ECF No. 24-1 (Joint Claim Construction Statement) at 3; *see also* ECF No. 42 (Opinion and Order) at 28.

RESPONSE: Undisputed.

[redacted]

35. On May 8, 2020, the Court issued its Markman order, construing these terms to mean "a stand alone diamond [made by chemical vapor deposition] having insubstantial non-monocrystalline growth." ECF No. 42 (Opinion and Order) at 27–29.

RESPONSE: Undisputed.

36. In reaching this construction, the Court acknowledged that a stand-alone diamond remains "single crystal" even if containing "small and localized amounts of polycrystallinity or other impurities." *Id*. at 28.

RESPONSE: Undisputed that the Court indicated that the parties "agree that a diamond can still be deemed single-crystal even if it contains small and localized amounts of polycrystallinity or other impurities . . . . But [the parties] disagree about how to describe the amount of impurity that is acceptable." Claim Construction Order (Dkt. No. 42) at 16 (internal citations omitted).

37. The Court acknowledged the parties' "agree[ment] that a 'single-crystal' diamond is a stand-alone diamond that has a primarily single-crystal, as opposed to polycrystalline, structure" and "that a diamond can still be deemed single-crystal even if it contains small and localized amounts of polycrystallinity or other impurities, such as graphite, twinned diamond, or diamond-like carbon, in its atomic structure." *Id*. at 28.

RESPONSE: Disputed that "primarily single-crystal" is an appropriate construction. For example, the Court held that "substantially single-crystal" is an inappropriate construction. Claim Construction Order (Dkt. No. 42) at 29. Otherwise, undisputed.

38. On September 18, 2020, Plaintiffs offered opening expert reports, including the report of Dr. Michael Capano in support of infringement of the asserted '078 patent. Chajon Decl. Ex. 1 (Capano Rep.) cover page, signature page.

[redacted]

RESPONSE: Undisputed.

39. On October 9, 2020, Plaintiffs offered rebuttal reports, including the report of Dr. Karen Gleason regarding the validity of the asserted patents. Chajon Decl. Ex. 3 (Gleason Rep.) cover page, signature page.

RESPONSE: Undisputed.

II. NOUVEAU AND FENIX INFRINGEMENT OF THE '078 PATENT IS DISPUTED.

A. Disputed Issues of Material Fact Exist Regarding Nouveau's Manufacture of "Single-Crystal" Diamond.

40. Fenix Diamonds claims to sell the [redacted] Chajon Decl. Ex. 5, June 18, 2019 Email from [redacted]

RESPONSE: Undisputed that an email [redacted] dated June 18, 2019, stated, *inter alia*, that the Fenix "control[s] . . . distributing [redacted] *See* Chajon Decl. Ex. 5, FD087413.

41. Plaintiffs' infringement expert Dr. Michael Capano, Ph.D. commissioned experiments to determine whether Fenix's diamonds are single crystal. Chajon Decl. Ex. 1 (Capano Rep.) ¶¶ 277–278.

RESPONSE: Disputed. Fenix lacks information sufficient to determine.

42. Following best practices, Dr. Capano's tests included a rocking curve analysis on a finished-diamond sample Plaintiffs received from Fenix, which Fenix represented was manufactured by Nouveau. *Id*.

RESPONSE: Disputed. Fenix lacks information sufficient to determine.

[redacted]

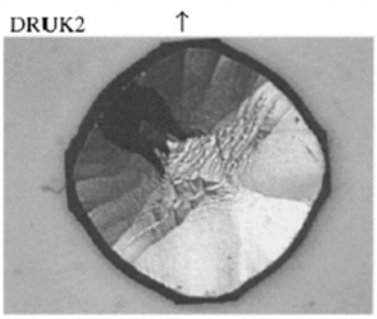
43. Dr. Capano reviewed the analytical results of his tests and concluded that "diamonds produced by Nouveau are single crystal and have insubstantial amounts of non-monocrystalline growth." *Id.* ¶ 278.

RESPONSE: Disputed as misleading. Dr. Capano analyzed what Fenix sells, not what Nouveau grows. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 277. The diamonds Nouveau grows are [redacted] post-processed to remove non-monocrystalline growth before Fenix receives them. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 281.

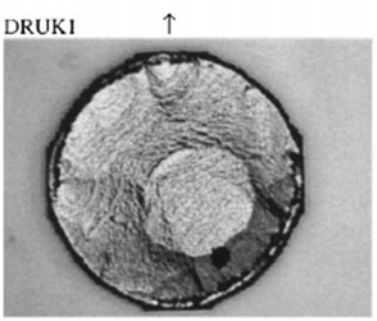
44. Dr. Capano applied the Court's construction of the terms "single-crystal diamond" and "single crystal CVD diamond" when conducting his analysis. *See id.* ¶¶ 268–269.

RESPONSE: Disputed. For example, in her expert report, Dr. Gleason forcefully argues that to determine whether a diamond practices the claims, the diamond must be evaluated directly after growth concludes and before any cutting has occurred. Chajon Decl. Ex. 3 (Gleason Rpt.) at ¶ 128 ("In other words, the so-called flat single crystal diamond [in Saito] referenced to by Dr. Pinneo [who explicitly identifies that he is applying Plaintiffs' erroneous claim constructions when addressing Saito] *is not a direct result of the growth process but has been cut and reformed multiple times*." (emphasis added); *see also* Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 73:13–21 ("Q. Is sample DRUK2 a single-crystal diamond? A. Not according to the claim[] construction *because of the noncrystalline—nondiamond region around the edge*. And also within the central part of the [single-crystal] region, [there are defects].") (emphasis added).

[redacted]



See also Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 74:5–19 ("Q. So would it be accurate to say that sample DRUK1 has more than insubstantial nonmonocrystalline growth? A. *Yes . . . my primary attention is to the external black ring* [in DRUK1]. And, you know, additionally, you have to consider that there [are] grain boundaries elsewhere.") (emphasis added).



45. Dr. Capano's experiments were performed on brilliant cut and polished stones received from Fenix. *Id.* ¶ 277.

RESPONSE: Undisputed.

46. Plaintiffs served a discovery request on Fenix for, *inter alia*, "five rough diamonds before the flash is cut off" and "five rough diamonds after the flash is cut off." Chajon Decl. Ex. 6, Plaintiffs' Second Set of Requests to Fenix for the Production of Documents and Things (No. 92) at 1–2.

RESPONSE: Undisputed.

[redacted]

47. Fenix had possession of an as-grown diamond batch for at least some part of this case. Chajon Decl. Ex. 7, July 19, 2020 Letter from N. Kopinski to T. Wikberg at 1.

RESPONSE: Disputed. The cited letter contains an invitation from Nouveau, not Fenix, to inspect an as-grown diamond batch. Chajon Decl. Ex. 7, July 19, 2020 Letter from N. Kopinski to T. Wikberg at 1 ("In our letter dated June 22, 2020, we explained that Nouveau has agreed to make an ordinary, as-grown diamond batch available for an in-person inspection on a "Highly Confidential" basis under the Protective Order.")

48. Fenix's counsel (purportedly on behalf of Nouveau) refused to allow Plaintiffs to take possession of a sample as-grown batch of diamonds to perform testing. *Id.*

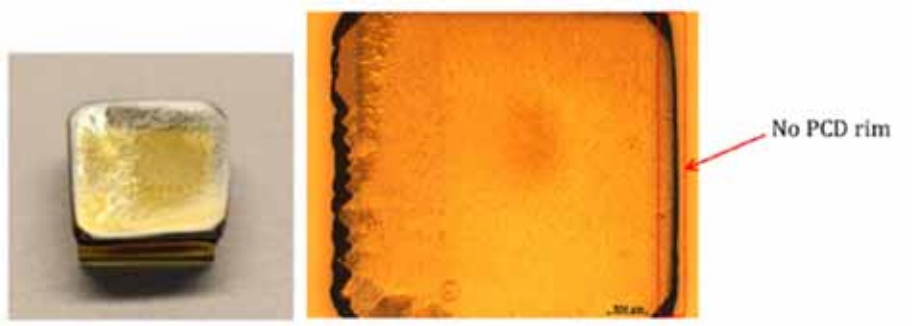
RESPONSE: Disputed. On June 22, 2020, Plaintiffs received an offer to inspect an as-grown Nouveau batch in Chicago. Second Kopinski Decl. Ex. 23 (June 22, 2020 Letter to Plaintiffs' Counsel from Nicole Kopinski) at 1.

Plaintiffs were further advised Nouveau would consider external testing and asked Plaintiffs to "identify which additional tests [are] need[ed] . . . to determine whether the diamonds practice the asserted claims." Second Kopinski Decl. Ex. 24 (July 1, 2020 email correspondence to Plaintiffs' Counsel from Max Snow) at 1. Plaintiffs did not reply.

49. All single-crystal diamonds have some amount of edge growth as a byproduct the growing process. Kopinski Decl. Ex. 4 (Capano Rep.) ¶ 281.

RESPONSE: Disputed if "edge growth" means "polycrystalline growth." For example, Nad, Gu & Asmussen grew a diamond with "no polycrystalline diamond rim."

[redacted]



Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rep.), at ¶ 40 (citing to Nad, Gu & Asmussen, Diam. Relat. Mater. 60 (2015) at 31 ("No PCD [polycrystalline diamond] rim" caption original)).

50. This growth may be, e.g., polycrystalline material, polycrystalline diamond, polycrystalline graphite, or other forms of carbon. Chajon Decl. Ex. 8, Transcript of October 20, 2020 Michael Capano Deposition at 143:16–144:8; *see also id.* 78:7–17, 79:24–80:13, 95:2–12, 120:16–121:13, 121:25–122:10.

RESPONSE: Disputed. According to the '078 patent, all growth, including graphite, is diamond. Kopinski Decl. Ex. 2 ('078 patent) at 14:17–21 ("diamond-like carbon" is a "[t]ype of [d]iamond."). Disputed to the extent this suggests that [redacted] non-monocrystalline growth may be non-diamond. Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 167:2–4 ("A. Well, actually . . . he [Dr. Capano] applied 1.0 [emissivity] to the dark region [redacted] and, you know, it's noncrystalline *diamond*.") (emphasis added). The '078 patent states that "diamond-like carbon" is a "[t]ype of [d]iamond." Kopinski Decl. Ex. 2 ('078 patent) at 14:17-21.

51. Nouveau removes such growth as part of the cutting process to create a gemstone. Kopinski Decl. Ex. 5 ("Nouveau Affidavit") at 6.

[redacted]

RESPONSE: Fenix objects to this paragraph as vague and misleading to the extent it uses the term "such growth." Otherwise undisputed that post-processing (including multiple rounds of cutting, two rounds of annealing, and polishing, etc.) removes Nouveau's non-monocrystalline growth.

52. Publications by inventors of the '078 Patent reflect that growth along the peripheries of a diamond will occur even when the patented process is followed. *E.g.,* Kopinski Decl. Ex. 8, Yan-3 at 2 ("Moreover, the corner magnification in Fig. 1 shows that considerable spherical diamond-like carbon exists on the edge and corner, but the top edge is sharp and straight. After polishing off the small amount of black diamond-like carbon, which broadens the XRD peak width, our CVD diamond is a single crystal.").

RESPONSE: Disputed. Neither the examples set out in the '078 patent nor the Yan paper purport to have maintained all temperature gradients at less than 20°C. See Kopinski Decl. Ex. 2 ('078 patent) at 13:38–14:52 (no temperature gradient control performed); Kopinski Decl. Ex. 8 (Yan) at 12523–25 (same). Thus, these examples, if anything, could apply to claim 62 of the '078 patent where no temperature gradient control is required.

53. Statements by inventors of the '078 Patent reflect that growth along the peripheries of a diamond will occur even when the patented process is followed. *E.g.,* Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 150–54.

RESPONSE: Disputed. The '078 patent is explicit that no polycrystalline growth occurs if temperature gradients are maintained at less than 20°C. Kopinski Decl. Ex. 2 ('078 patent) at 6:48–54 ("Precise control over… growth surface temperature gradients *prevents the formation of polycrystalline diamond*.") (emphasis added); *id*. at 5:5–9 ("the distance D *can not* be so large as

[redacted]

to prevent the heat-sinking effect of the [side-contact-holder] *that prevents the formation of twins or polycrystalline diamond* along the edges.") (emphasis added to all).

Dr. Capano agrees: if polycrystalline growth occurred, then growth would be inherently non-uniform due to the disparity between the single-crystal domain and the polycrystalline domain. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 186 ("[The '078 patent] teaches that temperature gradients of less than 20° C are *necessary* to produce uniform growth over large diamonds.") (emphasis added).

54. Statements by others in the field indicate that peripheral growth with MPCVD processes was known and expected. *E.g.,* Chajon Decl. Ex. 9, U.S. Patent No. 10,100,433 to Nebel, at Background.

RESPONSE: Disputed for being misleading. Undisputed that others in the field, *who do not practice claims 1 and 12 of the '078 patent*, expect peripheral polycrystalline growth. Noted that polycrystalline growth at the edges is the exact problem that the '078 patent purports to solve by controlling all temperature gradients to less than 20°C. *See* Response to Plaintiffs' SOF 53.

55. It was known prior to the filing of the '078 patent that peripheral growth with MPCVD processes was known and expected. *E.g.,* Chajon Decl. Ex. 10, Chih-Shiue Yan and Yogesh K. Vohra, *Multiple Twinning and Nitrogen Defect Center in Chemical Vapor Deposited Homoepitaxial Diamond*, 8 Diamond & Related Materials, 2022–031, 2026 (1999).

RESPONSE: Disputed for being misleading. *See* Response to Plaintiffs' SOF 53. Undisputed that others in the field, *who do not practice claims 1 and 12 of the '078 patent*, expect peripheral polycrystalline growth.

[redacted]

56. The Court set no numerical limit on the amount of non-monocrystalline growth that is "insubstantial" under the Court's construction. ECF No. 42 (Opinion and Order) at 28–29.

RESPONSE: Undisputed but noted that Dr. Hemley testified "If I were educated in the field . . . I would think [that a "small degree" of polycrystallinity] might be on the order of *a percent*."). Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 266:20–22 (emphasis added).

57. In deposition, Fenix's counsel pointed Dr. Russel Hemley to a comment in the '078 patent explaining that Example 1 produced single crystal diamond with "a small degree of polycrystallinity" and asked Dr. Hemley to quantify "small degree." Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 259:12–260:4.

RESPONSE: Undisputed.

58. Dr. Hemley responded to the questioning posed by Fenix's counsel in deposition regarding quantification of polycrystallinity in the '078 patent, noted above, that he was "not able to quantify it now." *Id.*

RESPONSE: Disputed. Dr. Hemley testified that "If I were educated in the field . . . I would think [that a "small degree" of polycrystallinity] might be on the order of *a percent*."). Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 266:20–22 (emphasis added).

59. Dr. Hemley further stated in response to Fenix's counsel's questioning regarding quantification of polycrystallinity in the '078 patent, "At this point 18 years later I don't know what the number is. If you are looking for my sense now of what 'small degree' means, I would suggest that it might be in the percent range, but I don't know if that is accurate." *Id.* at 260:5–9.

RESPONSE: Disputed for being misleading. Dr. Hemley testified that "If I were educated in the field . . . I would think [that a "small degree" of polycrystallinity] might be on the order of *a percent*."). Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 266:20–22 (emphasis added).

[redacted]

B. Disputed Issues of Material Fact Exist Regarding Nouveau's Control of the Temperature of a Growth Surface Such That All Temperature Gradients Are Less Than 20 °C.

60. A side-contact holder is not necessary to achieve the claimed temperature gradients. Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 723; *see also id.* ¶¶ 567, 596–625, 629–632; Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 56:8–22, 98:8–14.

RESPONSE: Disputed. Dr. Vohra testified that a side-contact-holder would be required, in his opinion, to maintain all temperature gradients under 10, 20, or 30°C. Second Kopinski Decl. Ex. 28 (Vohra Dep. Tr.) at 179:23–180:9. And during the claim construction hearing, the Court observed: "So the '078 patent, I don't think it can be read to claim all MPCVD diamonds grown at low temperature gradients. It appears to be claiming a particular apparatus for producing such diamonds, including a heat-sinking holder for holding the diamond, and methods for positioning the diamond in the holder." Second Kopinski Decl. Ex. 34 (Claim Construction Hrg. Tr.) at 66:11–17. *See also* Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rpt.) at ¶¶ 978–1073.

61. Dr. Gleason stated that a side-contact holder is not necessary to achieve the claimed temperature gradients. Chajon Decl. Ex. 3 (Gleason Rep.) ¶ 723; *see also id.* ¶¶ 567, 596–625, 629–632. Dr. Hemley explained that a side-contact holder is not necessary to achieve the claimed temperature gradients. Chajon Decl. Ex. 2 (Hemley Dep. Tr.) at 56:8–22, 98:8–14.

RESPONSE: Undisputed that Dr. Gleason and Dr. Hemley said this. Disputed that Dr. Hemley "explained" it.

62. In connection with this litigation, Dr. Capano oversaw a Finite Element Analysis ("FEA"). Chajon Decl. Ex. 1 (Capano Rep.) ¶ 376 & Appendix AA.

RESPONSE: Undisputed.

[redacted]

63. Dr. Capano's FEA was conducted without assuming the presence of a side-contact holder. *Id.* ¶ 259.

RESPONSE: Undisputed.

64. Dr. Capano's FEA resulted in temperature variations across the growth surface well within a 20 °C gradient limit. Chajon Decl. Ex. 1 (Capano Rep.) ¶ 259 & Appendix AA.

RESPONSE: Disputed for suggesting that Dr. Capano's FEA analysis has any relationship to Nouveau's process or diamond MPCVD growth. Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 263:13–16 ("Q. You were not attempting to model the Nouveau process; is that fair? A. That is fair."); *id*. at 265:22–24 ("A. Only a thermal analysis was considered [in the FEA]. We did not consider radiation or convection. Q. Are those components of heat transfer in a real process? A. Yes."); Kopinski Decl. Ex 15 (Tsach Dep. Tr.) at 324:7–20 ("A. I do not believe that there are models that can provide you with [growth surface temperatures] by modeling. Q. Why is that? A. Because there are ranges of edge conditions in the model . . . and this impact is so significant that you end up with ambiguity in regard to the results."); Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 77:12–19 ("A. And when you actually do an experiment, there are always factors that occur that are not anticipated in computer models. Q. And those factors would influence temperature uniformity on the growth surface. Is that accurate? A. Yes.").

65. In Dr. Capano's FEA, transient temperature gradients imposed on the growing diamond dissipated rapidly spreading the thermal energy across the diamond, which behaves to a large degree as an insulated mass. Chajon Decl. Ex. 1 (Capano Rep.) ¶ 259 & Appendix AA.

RESPONSE: Disputed for suggesting that Dr. Capano's FEA has any relationship to the true conditions inside a MPCVD reactor. Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.)

[redacted]

263:13–16 ("Q. You were not attempting to model the Nouveau process; is that fair? A. That is fair."); *id*. at 265:22–24 ("A. Only a thermal analysis was considered [in the FEA]. We did not consider radiation or convection. Q. Are those components of heat transfer in a real process? A. Yes."); Kopinski Decl. Ex 15 (Tsach Dep. Tr.) at 324:7–20 ("A. I do not believe that there are models that can provide you with [growth surface temperatures] by modeling. Q. Why is that? A. Because there are ranges of edge conditions in the model . . . and this impact is so significant that you end up with ambiguity in regard to the results."); Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) 77:12–19 ("A. And when you actually do an experiment, there are always factors that occur that are not anticipated in computer models. Q. And those factors would influence temperature uniformity on the growth surface. Is that accurate? A. Yes."). *See also* Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rpt.) at ¶¶ 978–1073.

66. Dr. Capano thus determined from the FEA that a side-contact holder is not necessary to achieve the claimed temperature gradients. *Id.* ¶¶ 257–259.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 65.

67. Dr. Capano also offered evidence that that Fenix practices the claimed temperature gradients without the use of a side contact holder. *Id.* ¶¶ 205–224 & 235–265.

RESPONSE: Disputed. First, Dr. Capano did not apply the Court's construction of "growth surface." Kopinski Decl. Ex. 4 (Capano Rep.) at ¶ 214 ("I do not read the claim to include the non-diamond carbon or polycrystalline material growing on Nouveau's diamonds . . . as part of the diamond or its growth surface as set forth in the claims."); Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 178: 3-11 ("Q. So the defective material in View 10 [of the Nouveau Affidavit] is not included in the growth surface, in your view? A. And that's what we were getting back to earlier. In my view there is no way of identifying this as solely polycrystalline

[redacted]

diamond. I believe that it contains polycrystalline diamond, possibly polycrystalline graphite, possibly non-diamond carbon; and therefore, that is not the growth surface."). Dr. Capano improperly excluded non-monocrystalline growth from the construction of growth surface. *Compare* Kopinski Decl. Ex. 4 (Capano Rep.) at ¶ 167 ("In my opinion, the growth surface is the region where single-crystal diamond grows . . . and does not include the surrounding areas."); Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 178:8-11 ("I believe that it contains polycrystalline diamond, possibly polycrystalline graphite, possibly non-diamond carbon; and therefore, that is not the growth surface.") *with Markman* Order at 19 ("Plaintiffs' proposed construction [of "growth surface"] . . . would wrongly restrict the term to include only surface area where single-crystal diamond is growing."). Dr. Capano also did not apply the court's construction of "growth surface" with respect to hydrocarbon deposition. *Compare* Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 180:21-181:4 ("Q. So you are not willing to answer a hypothetical question in which the meaning of the term 'growth surface' includes the entire surface where hydrocarbon gases are accruing; is that correct? A. No, I am not willing to include the entire surface upon which hydrocarbon gases are accruing. I think that's contrary to the Court's construction.") *with Markman* Order at 19 ("Since the Patent uses ['growth surface'] to refer to the entire surface where hydrocarbon gases are accruing into new diamond, the claim construction must impart the same meaning."). Dr. Capano also wrongly excluded polycrystalline growth from the construction of growth surface. *Compare* Kopinski Decl. Ex. 4 (Capano Rep.) at ¶ 173 ("I do not interpret growth surface to include the non-diamond or polycrystalline diamond that grows at the periphery of the single crystal diamond."); Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 178:20-24 ("Q. Sure. The non-monocrystalline material . . . is not included in the term 'growth surface' in your opinion? A. It is not included in

[redacted]

the Court's opinion of what the growth surface is.") *with Markman* Order at 20 ("The construction of the term 'growth surface' must therefore not exclude polycrystalline growth.").

Second, Dr. Capano did not apply the Court's construction of "maintain." *Contrast* Chajon Decl. Ex. 1 (Capano Rpt.) at ¶ 218 (conceding that his analysis does not apply to

[redacted]

with Markman Order at 17 (holding that "maintain" means "for substantially the entire growth process."). Third, Dr. Capano did not apply the Court's construction of "*all* temperature gradients," instead, he only considered point measurements. Markman Order at 15–16 ("Claims 1 and 12 refer to '*all* temperature gradients across the growth surface,' *not merely those measured between the middle and the edge*.") (emphasis added). Therefore, Dr. Capano's report and testimony have no evidentiary value.

See also Pls.' Reply Claim Construction Br. (Dkt. No. 34) at 8 ("Fenix goes even further astray by arguing that . . . measuring temperatures at the middle and an edge of a diamond growth surface 'is the only way to determine the maximum temperature gradient.' *Not so. Growth surface heat patterns may have localized hot spots . . .* for which the maximum temperature difference will not be reflected by middle and edge temperature measurements but would be reflected by one or more measurements localized on the hot spot itself.") (emphasis added).

Furthermore, Dr. Capano's "correction" procedure involved applying the emissivity of opaque polycrystalline diamond to "correct" the temperature of Nouveau's single-crystal domain. Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 148:18–22 ("Q. So going back to Dr. Capano's report, it appears that all three references Dr. Capano relied on [for the emissivity

[redacted]

of Nouveau's single-crystal domain] were for polycrystalline diamond? A. That's right."); Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rpt.) at ¶¶ 286–309.

In addition, temperature measurements on polycrystalline material are inaccurate. Second Kopinski Decl. Ex. 35 (Tsach Dep. Tr.) at 311:2–4; Second Kopinski Decl. Ex. 20 (Gleason Rpt.) at ¶ 668 ("[A]ny temperature measurements on the polycrystalline material [performed by Mr. Tsach] are likely inaccurate."). And Nouveau's [redacted] pyrometer is incapable of finding the hottest and coldest temperature on a growth surface. Chajon Decl. Ex. 1 (Capano Rpt.) at ¶ 218 (describing how a [redacted] pyrometer finds an "*average*" of the temperatures in its sampling spot) (emphasis added). It is not possible to find the hottest or coldest temperatures over an area with a device that measures an average. Second Kopinski Decl. Ex. 19 (Pinneo Invalidity Rpt.) at ¶¶ 1094–1139.

Disputed because Fenix does not manufacture diamonds, Nouveau does. Chajon Decl. Ex. 4 (Mehta Dep. Tr. 40:1–16 (Fenix "acquires its diamonds produced by Nouveau Diamonds LLP.").)

68. Based on the testimony of Dr. Hemley, Dr. Capano reasoned that adjacent diamonds could act like a holder not only minimizing plasma access to the sides of the seed, but also act as a heat buffer that can absorb and provide thermal energy as necessary to maintain uniform temperature. *Id.* ¶ 260.

RESPONSE: Undisputed that Dr. Capano writes this. Noted that each of Nouveau's diamonds includes [redacted] Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rpt.) at ¶¶ 88, 604. Noted that Dr. Capano all but concedes that Nouveau does not maintain sub-20 °C gradients under the Court's construction. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 186 (The '078 patent teaches that

[redacted]

"temperature gradients of less than 20° C are *necessary* to produce uniform growth over large diamonds."). Nouveau's diamond batches have [redacted] NV990, for example, is accused of infringing. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 25.

[redacted]

69. In view of this testimony, Dr. Capano examined images [redacted], without need for a side contact holder. *Id.* ¶ 261.

RESPONSE: *See* Response to Plaintiffs' SOF 68.

70. The '078 patent states that, in certain embodiments of the invention, the heat-sinking capabilities of a holder or precise controls of temperature gradients may prevent or reduce the formation of non-monocrystalline diamond. Kopinski Decl. Ex. 2 ('078 patent) at 4:52–55, 5:5–8, 6:51–54.

RESPONSE: Disputed. The '078 patent states that *all* embodiments require the side-contact/heat-sinking holder. Kopinski Decl. Ex. 2 ('078 patent) at 5:5–8. The '078 patent further

[redacted]

states that precise control of temperature gradients *always* prevents non-monocrystalline growth. *Id*. at 6:51–54.

71. The ’078 patent states that earlier methods of MPCVD diamond growth resulted in “heavily twinned single crystal diamonds, polycrystalline diamond, or no diamond at all.” *Id.* at 1:56–59.

RESPONSE: Undisputed.

72. The ’078 patent explains that the patented method allowed “a large single crystal diamond to be grown” with “a small degree of polycrystallinity localized at the top edges of the diamond.” *Id.* at Abstract, 13:66–14:1.

RESPONSE: Undisputed that the ’078 patent contains the quoted language, which is excerpted without full context, otherwise disputed. The ’078 patent provides that by following the claimed method, zero non-monocrystalline material will grow. Kopinski Decl. Ex. 2 (’078 patent) at 6:51–54. The ’078 patent does not allege that all temperature gradients were maintained at less than 20 °C when diamond “with a small degree of localized polycrystallinity” was grown, nor could have the ’078 patent so alleged since the technology employed by the inventors was incapable of finding both the maximum temperature and the minimum temperature on a growth surface. Second Kopinski Decl. Ex. 28 (Vohra Dep. Tr.) at 150:5–12 (“Q. So my question is, if you’re measuring . . . the center of a diamond with this pyrometer [from the ’078 patent], will the pyrometer be able to tell you what the coldest point on the diamond is? *A No.* Q. Because it’s going to take an average; is that right? A. Yes.”) (emphasis added).

73. The ’078 patent does not suggest that the invention eliminates all non-monocrystalline growth. *See id.*

[redacted]

RESPONSE: Disputed. The '078 patent provides that by following the claimed method, zero non-monocrystalline material will grow. '078 patent at 6:51–54. The '078 patent does not allege that all temperature gradients were maintained at less than 20 °C when diamond "with a small degree of localized polycrystallinity" was grown, nor could have the '078 patent so alleged since the technology employed by the inventors was incapable of finding both the maximum temperature and the minimum temperature on a growth surface. Second Kopinski Decl. Ex. 28 (Vohra Dep. Tr.) at 150:5–12 ("Q. So my question is, if you're measuring . . . the center of a diamond with this pyrometer [from the '078 patent], will the pyrometer be able to tell you what the coldest point on the diamond is? *A. No.* Q. Because it's going to take an average; is that right? A. Yes.) (emphasis added).

74. Dr. Capano does not suggest that the invention eliminates all non-monocrystalline growth. Kopinski Decl. Ex. 4 (Capano Rep.) ¶ 69.

RESPONSE: Disputed. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 186 (The '078 patent teaches that "temperature gradients of less than 20° C are *necessary* to produce uniform growth over large diamonds.") (emphasis added). The simultaneous presence of a non-monocrystalline domain and a single-crystal domain is inherently non-uniform growth.

75. Dr. Gleason explained that the *Saito* publication addresses the "bulk temperature for the diamond . . . and [is] not an assessment of gradients across the growth surface." Kopinski Decl. Ex. 7 (Gleason Rep.) ¶¶ 112–13.

RESPONSE: Undisputed because Dr. Gleason testified that to practice the claims, "one needs to directly measure the temperature gradients [at least during the development stage]." Gleason Dep. Tr. at 66:20–25. Like Saito, Nouveau never measured a temperature gradient before this litigation. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 181 ([Temperature

[redacted]

gradient measurements] "[are] not a generally applied practice."); Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 369 .

76. Dr. Gleason noted that the "growth at the corners [of the *Saito* product]" could "suggest that the temperature at the corners is different from the temperature in the center," but this observation was based on the fact that Saito used specially-prepared diamond seeds "having low-index planes," and is not applicable to other MPCVD systems [redacted] that did not have such special seeds. *Id.* ¶ 113; Chajon Decl. Ex. 11, Transcript of October 22, 2020 Karen K. Gleason Deposition at 48:2–49:14.

RESPONSE: Undisputed that Dr. Gleason's report contains portions of the quoted language, which is excerpted without full context, otherwise disputed. Dr. Gleason's report unambiguously states that non-monocrystalline growth at the periphery of a single-crystal domain "suggests that there is a relatively large temperature gradient across the surface." Kopinski Decl. Ex. 7 (Gleason Rpt.) at ¶ 113.

77. Under the Hague Treaty on the Collection of Evidence, Plaintiffs have sought to authenticate Nouveau evidence and secure testimony on Nouveau's diamond manufacture process. Moffa Decl.[3] ¶ 1; *see* ECF No. 48. [footnote omitted]

RESPONSE: Undisputed that Plaintiffs have filed through the Hague Treaty. Disputed that Plaintiffs have made reasonable efforts to authenticate any Nouveau evidence.

78. Fenix purports that it does not [redacted] ECF No. 61 (sealed copy) at 1.

RESPONSE: Undisputed.

[redacted]

79. Fenix previously represented to this Court that [redacted]

[redacted]

Id.; *see id.* at 2 [redacted]

[redacted]

RESPONSE: Undisputed.

80. Nevertheless, Fenix's counsel allegedly worked with Nouveau to generate "thermal camera data" and pyrometer data for this litigation. Chajon Decl. Ex. 12, Transcript of October 16, 2020 J. Michael Pinneo Deposition ("Pinneo Dep. Tr.") at 9:10–12:12, 204:2–205:7, 208:10–209:3.

RESPONSE: Fenix objects to this paragraph to the extent it uses the word "allegedly," which renders this alleged fact disputed. Further, disputed on the basis that this is not a proper statement of fact, given that it seeks to probe information that is protected by the attorney-client privilege and work product doctrine.

81. Instructions were provided by Fenix's counsel to Nouveau to conduct certain experiments. Chajon Decl. Ex. 12 (Pinneo Dep. Tr.) at 9:10–12:12.

RESPONSE: Fenix objects to this paragraph to the extent it uses the word "certain," which renders this alleged fact disputed. Further, disputed on the basis that this is not a proper statement of fact, given that it seeks to probe information that is protected by the attorney-client privilege and work product doctrine.

82. Dr. Pinneo was not a party to any communications between Fenix's counsel and Nouveau. Chajon Decl. Ex. 12 (Pinneo Dep. Tr.) at 9:10–12:12.

RESPONSE: Undisputed.

[redacted]

83. No communications between Fenix's counsel and Nouveau have been provided to Plaintiffs. Moffa Decl. ¶ 4.

RESPONSE: Disputed. Nouveau has provided to both Fenix's counsel and Plaintiffs:

- A notarized affidavit documenting their process. *See* NV957–977; Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 225 (finding the Affidavit to set out Nouveau's "normal" process).
- [redacted] Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 163.
- [redacted] *See* NV8–690, NV962–977.
- [redacted] *See generally* NV952–4416 (files ending in .jpg).
- [redacted] *See generally*, NV952–4416 (files ending in .mov or .wmv).
- [redacted] *See* NV741–869.
- [redacted] *See* NV1103–1104, NV1334–1339.
- [redacted] *See* NV709–740, NV1662–1663.
- [redacted] *See* Second Kopinski Decl. Ex. 29 (2020-5-18 Ltr.) at 2; Second Kopinski Decl. Ex. 30 (2020-6-15 Ltr.) at 2; NV932 at ¶ 4; Second Kopinski Decl. Ex. 31 (2020-8-26 Ltr.) at 1.
- [redacted] *See* Second Kopinski Decl. Ex. 23 (2020-6-22 Ltr.) at 1; Second Kopinski Decl. Ex. 24 (2020-7-2 Ltr.) at 1.
- Both Fenix and Plaintiffs' identified [redacted] in their Rule 26(a) disclosures. Second Kopinski Decl.

[redacted]

Exs. 25, 26 (Rule 26(a) disclosures). Plaintiffs "supported a more complete deposition of [redacted] which is yet-to-be-scheduled." Second Kopinski Decl. Ex. 27 (October 28, 2020 email correspondence from Steven Sklar to Mr. James Mandik).

84. No instructions from Fenix's counsel to Nouveau to conduct certain experiments have been provided to Plaintiffs. Moffa Decl. ¶ 5.

RESPONSE: Undisputed.

85. Dr. Pinneo claims that infrared cameras are not able to measure temperature gradients. Chajon Decl. Ex. 13, Expert Report of J. Michael Pinneo, Ph.D. Regarding Invalidity of U.S. Patent Nos. RE41,189 and 6,858,078 ¶¶ 1137–39.

RESPONSE: Disputed for being misleading. Dr. Pinneo finds that an infrared camera can be used to find the lowest possible value of the maximum temperature gradient, but not the highest possible value. Chajon Decl. Ex. 13 (Pinneo Invalidity Rpt.) at ¶ 1137–1139. Put differently, if an infrared camera reports a maximum temperature gradient of 50°C, then the true maximum temperature gradient is *at least* 50°C. *Ibid*.

86. Dr. Capano offered evidence that Fenix practices the claimed temperature gradient limitation, including testimony that the thermal camera data is unreliable. Chajon Decl. Ex. 1 (Capano Rep.) ¶¶ 225–234.

RESPONSE: Disputed. Dr. Capano does not apply the Court's construction of "growth surface," "single-crystal," "maintain," or "all." *See* Response to Plaintiffs' SOF 67, above. Therefore, Dr. Capano's report and testimony have no evidentiary value. Noted that when convenient, Dr. Gleason relies on the thermal camera data Nouveau provided as credible evidence. Second Kopinski Decl. Ex. 20 (Gleason Rpt.) at ¶ 289 ("Indeed, the thermal camera image Dr. Pinneo relies upon from Nouveau [] would indicate that temperatures can vary very

[redacted]

sharply, even abruptly."). Further noted that Dr. Gleason proposes practicing the invention with a thermal camera. *Id*. at ¶ 623 (Thus, [a thermal] camera is able to map localized variations in temperature.").

87. Dr. Capano found "reasons to question to question both the manner in which the [thermal camera] experimental data was acquired and the possibility that the data can be used to make any scientifically accurate statements regarding either the temperature of the diamonds being grown or temperature gradients across the surface of the growing diamond." *Id.* ¶ 226.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 86, above.

88. Specifically, Dr. Capano observed that "the imaging camera reads directly through the center of the plasma," that "hydrogen is the most prominent gas used in MPCVD diamond manufacturing," and that "hydrogen has a strong emission at 1.094 microns (relative intensity 14,000) and at 0.875 microns (relative intensity 2,200) (*see e.g.*, ASD data from NIST CARN-FEN_00186588–00186591), both of which would be expected to interfere with the [thermal camera] readings." *Id.* ¶ 227.

RESPONSE: *See* Response to Plaintiffs' SOF 87, above.

89. Dr. Capano also "observed nothing . . . that indicated the instrument was properly calibrated taking into account any interferences in the optical path including the windows used for the growth chamber or effects caused by the plasma as previously mentioned." *Id.* ¶ 228.

RESPONSE: *See* Response to Plaintiffs' SOF 87, above. Further noted that Dr. Gleason effectively concedes that Nouveau does not maintain a uniform growth surface temperature. Second Kopinski Decl. Ex. 20 (Gleason Rpt.) at ¶ 712 ("A uniform temperature of a single crystal diamond… would have a visual appearance of a uniform color."). The videos Dr. Capano

[redacted]

relies on to prove infringement show the diamond with a [redacted] non-uniform color. *See* Kopinski Decl. Ex. 4 (Capano Rpt.) at p.84, n.2. (relying on NV1273 to prove infringement).

[redacted]

See also Second Kopinski Decl. Ex. 33 (Pinneo Non-infringement Rpt.) at ¶¶ 190–206.

90. Dr. Capano also observed inconsistencies between the thermal camera data and pyrometer data, noting that "the temperature distribution in the thermal imaging videos also indicates that the temperature data being reported is inconsistent with, and far in excess of the temperatures reported using the AST pyrometers as part of the manufacturing process . . . ." *Id.*

RESPONSE: Disputed for being misleading. Nouveau's pyrometers are [redacted] Second Kopinski Decl. Ex. 17 (Capano Rpt.) at p.85, n.3. Dr. Capano agrees that the emissivity of diamond is less than [redacted]. *Ibid*. Therefore, Dr. Capano agrees that [redacted] Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 212 [redacted]

91. Dr. Capano also observed numerous artifacts in the thermal camera data. *Id.* ¶ 229.

RESPONSE: Disputed. Dr. Capano noticed [redacted] in the thermal camera videos. Second Kopinski Decl. Ex. 17 (Capano Rpt.)

[redacted]

at ¶¶ 229, 232. [redacted]

[redacted] *See* Kopinski Decl. Ex. 4 (Capano Rpt.) at p.84, n.2. (relying on NV1273 to prove infringement).

[redacted]

See also Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringment Rpt.) at ¶¶ 190–206.

92. Dr. Capano also expressed concern regarding use of the inner wall of the chamber as a temperature reference. *Id.* ¶ 230.

RESPONSE: Undisputed that Dr. Capano expressed this concern.

93. Dr. Capano analyzed Fenix's thermal camera data to the extent reasonably possible. *Id.* ¶ 226.

RESPONSE: Disputed. Nouveau provided more than [redacted] thermal camera records. Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rpt.) at ¶ 183. Dr. Capano only analyzed two. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 229–233.

94. Dr. Capano stated: "Not having the full experimental details or access to Fenix/Nouveau's technical expert I cannot be certain that is correct, and I cannot opine on this experimental data to the extent that might otherwise be possible; as such I reserve the right to supplement my report, including the addition of literal infringement positions, in the event additional information becomes available." *Id.*

[redacted]

RESPONSE: Undisputed that Dr. Capano's Report includes this statement.

95. Dr. Gleason opined that Nouveau's thermal camera data is unreliable. Chajon Decl. Ex. 3 (Gleason Rep.) ¶¶ 648–49.

RESPONSE: Undisputed that in some locations in her report, Dr. Gleason believes it is unreliable. In other locations (namely, when convenient for Plaintiffs), Dr. Gleason finds it to be reliable. Second Kopinski Decl. Ex. 20 (Gleason Rpt.) at ¶ 289 ("Indeed, the thermal camera image Dr. Pinneo relies upon from Nouveau [] would indicate that temperatures can vary very sharply, even abruptly.").

96. Dr. Capano presented affirmative evidence that Nouveau performs steps to control temperature gradients and Nouveau's pyrometer data shows, when properly corrected, infringing gradients. Chajon Decl. Ex. 1 (Capano Rep.) ¶¶ 205–24.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 67, above.

97. Dr. Capano examined videos produced by Fenix/Nouveau documenting the temperatures measured by a pyrometer at more than one location on the surface of their growing diamonds. *Id.* ¶ 213.

RESPONSE: Undisputed.

98. Dr. Capano applied emissivity values of 0.7 and 1.0 to the recorded temperatures for the single crystal diamond and non-diamond carbon/graphitized polycrystalline material regions, respectively, and determined that all measured surface temperatures on each growing diamond seed were within 20 °C. *Id.* ¶¶ 217, 219–220.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 67, above.

99. From these consistent results, Dr. Capano concluded that "Fenix controls the temperature of a growth surface of all, or at least some, of its lab grown diamonds during the

[redacted]

growth process such that all temperature gradients across the growth surface of at least one stone in a given growth batch are less than 20° C either literally or under the doctrine of equivalents." *Id.* ¶ 224.

RESPONSE: Fenix objects to this paragraph as vague and misleading to the extent it uses the term "these consistent results." Disputed. Dr. Capano effectively concedes that Nouveau does not maintain low temperature gradients. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 186 (The '078 patent teaches that "temperature gradients of less than 20° C are *necessary* to produce uniform growth over large diamonds.") (emphasis added). It is indisputable that Nouveau does not generate uniform growth.

Dr. Capano noticed a [redacted] Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶¶ 229, 232. [redacted] *See* Kopinski Decl. Ex. 4 (Capano Rpt.) at p.84, n.2. (relying on NV1223 to prove infringement).

[redacted]

See also Second Kopinski Decl. Ex. 33 (Pinneo Non-Iinfringement Rpt.) at ¶¶ 190–206.

100. Dr. Capano performed additional experiments to "assess whether diamonds may be grown under conditions approximating those employed by Fenix/Nouveau, and to provide

[redacted]

relevant information to assist me in formulating an opinion on whether Fenix/Nouveau's process infringes the asserted claims of the '078 patent." *Id.* ¶ 346; *see also id.* ¶¶ 346–363.

RESPONSE: Disputed. The claimed conditions require maintaining the maximum temperature gradient (i.e., the difference between the minimum and maximum temperature on the growth surface) at less than 20°C for substantially the entire growth process. Markman Order at 15–18. But Dr. Capano did not find the maximum temperature gradient once, much less throughout the growth process. Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 252:17–22 ("Q. In any of your experiments in which you measured surface temperature gradients, did you ever attempt to determine the maximum and minimum temperatures? A. No."). Fenix lacks information sufficient to determine whether the growth was "high-quality," what conditions the growth occurred under, and disputes on this basis.

Dr. Capano disclaimed the experiments during his deposition. Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 252:17–22 ("Q. In any of your experiments in which you measured surface temperature gradients, did you ever attempt to determine the maximum and minimum temperatures? A. No."); *id*. at 239:6–10 ("Q. And would you agree with me that the three experiments that you describe in your expert report were not intended to model Nouveau's processes? A. That is a fair statement.").

Dr. Capano does not apply the Court's constructions of "growth surface," "maintain," "single-crystal," or "all." *See* Response to Plaintiffs' SOF 67, above. Therefore, Dr. Capano's report and testimony have no evidentiary value.

Disputed because Fenix lacks information sufficient to determine the conditions for these experiments and the results.

[redacted]

101. Those experiments explored growth conditions described in the '078 Patent, and conditions designed to test specific parametric departures from the conditions set forth in the '078 Patent. *Id.* ¶ 347.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 100.

102. The experiments were conducted on [redacted] *Id.*

RESPONSE: Disputed. Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 236:15–18 ("Q. But you just don't know what was used to hold the seeds; correct? A. That's fair. That's a reasonable statement."); *id*. at 236:19–237:15 (Dr. Capano testifying that he had no idea how [redacted]). *See also* Response to Plaintiffs' SOF 100.

103. One experiment demonstrated that high-quality growth with essentially uniform thickness could occurred under the claimed conditions at 1,220 °C. *Id.* ¶ 351–352.

RESPONSE: Disputed. *See* Plaintiffs' SOF to ¶ 100.

104. A second experiment used [redacted] *Id.* ¶ 358.

RESPONSE: Disputed. *See* Plaintiffs' SOF to ¶ 100.

Disputed that Dr. Capano's experiments were [redacted]

[redacted]

[redacted]

Disputed for being misleading by implying that [redacted]

[redacted]

Undisputed that Nouveau uses [redacted], whereas all asserted claims (except claim 12) require a pressure of 130 torr or greater. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 302–303. [redacted]. Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rpt.) at ¶ 64; Second Kopinski Decl. Ex. 36 (Martens Rpt.) at pp.vi, 10–12.

Disputed that Nouveau's [redacted]. Second Kopinski Decl. Ex. 17 (Capano Rpt.) at ¶ 289. [redacted]. Second Kopinski Decl. Ex. 33 (Pinneo Non-Infringement Rpt.) at ¶¶ 325, 351.

105. Dr. Capano stated "In order to assess the lower pressure growth conditions employed by Fenix/Nouveau and their impact on surface temperature gradients and diamond growth, a diamond seed was exposed to conditions more closely matching those Fenix/Nouveau uses in its commercial production, namely, [redacted] . . . The experiment demonstrates uniform diamond growth and the lack of a temperature gradient exceeding 20 °C." *Id.* ¶ 358.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 100.

[redacted]

106. This experiment also evidenced uniform diamond growth and the lack of a temperature gradient exceeding 20 °C. *Id.* ¶¶ 358–360.

RESPONSE: Disputed. *See* Response to Plaintiffs' SOF 100.

107. Dr. Capano directly compared the diamonds produced under these two experiments using 2-theta ((2Θ) X-ray scattering to assess the quality of the crystals produced. The data indicated the equivalence of the material grown at [redacted] and the presence of single crystal as opposed to polycrystalline diamond. *Id.* ¶¶ 361–363.

RESPONSE: Disputed. The experiments resulted in severe polycrystalline growth. Chajon Decl. Ex. 1 (Capano Rpt.) at ¶ 350. Disputed because Fenix lacks information sufficient to determine what X-ray scattering tests were performed or how.

108. Dr. Capano oversaw a Finite Element Analysis ("FEA") that modeled the heat transfer from the plasma to the diamond, focusing on plasmas like Nouveau's. Chajon Decl. Ex. 1 (Capano Rep.) ¶ 376 & Appendix AA.

RESPONSE: Disputed. Dr. Capano disclaimed the FEA analysis during his deposition, admitting has no relationship to Nouveau's process. Second Kopinski Decl. Ex. 16 (Capano Dep. Tr.) at 263:13–16 ("Q. You were not attempting to model the Nouveau process; is that fair? A. That is fair."); *id*. at 265:22–24 ("A. We did not consider radiation or convection [in the FEA]. Q. Are those components of heat transfer in a real process? A. Yes."); *See also* Kopinski Decl. Ex. 15 (Tsach Dep. Tr.) at 324:7–20 ("A. I do not believe that there are models that can provide you with [growth surface temperatures] by modeling. Q. Why is that? A. Because there are ranges of edge conditions in the model . . . and this impact is so significant that you end up with ambiguity in regard to the results."); Second Kopinski Decl. Ex. 21 (Gleason Dep. Tr.) at 77:12–19 ("A. And when you actually do an experiment, there are always factors that occur that

[redacted]

are not anticipated in computer models." Q. And those factors would influence temperature uniformity on the growth surface. Is that accurate? A. Yes.").

Dr. Capano does not apply the Court's constructions of "growth surface," "single-crystal," "maintain," or "all." above. Therefore, Dr. Capano's report and testimony have no evidentiary value. *See* Response to Plaintiffs' SOF 67.

109. Dr. Capano concluded that "the information obtained from Fenix/Nouveau regarding the uniformity of its process, the high thermal conductivity of diamonds, and the FEA discussed above, permit me to conclude that MPCVD diamond growth at Nouveau using the commercial SCP recipe and process does not occur outside the claimed limitation of a 20 ℃ temperature gradient." *Id.* ¶ 251.

RESPONSE: Disputed. *See* Responses to Plaintiffs' SOF 67, 100, 108, above.

Noted that Dr. Capano admits that Nouveau does not maintain temperature gradients at less than 20°C. Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 186 (The '078 patent teaches that "temperature gradients of less than 20° C are *necessary* to produce uniform growth over large diamonds."). Nouveau's diamonds are non-uniform.

Noted that Dr. Capano admits that Nouveau does not grow single-crystal diamond under the Court's construction of "growth surface." Kopinski Decl. Ex. 4 (Capano Rpt.) at ¶ 173 ("[I]f the 'parasitic' non-diamond or polycrystalline diamond material that grows during MPCVD diamond production was part of the 'growth surface' one would not be 'growing single-crystal diamond . . . on the growth surface' as required by the claim."). Undisputed to the extent that the Capano report paragraph 251 states the above quoted language.

[redacted]

III. ADMISSIONS

110. Fenix admits that it sells diamonds that have insubstantial polycrystalline diamond. Chajon Decl. Ex. 15, Defendant Fenix Diamonds LLC's Objections and Responses to Plaintiffs' First Set of Requests for Admission, at 74–75 (Response to Request 128).

RESPONSE: Undisputed.

111. Fenix admits that it sells diamonds that have insubstantial graphite inclusions. *Id.* at 75 (Response to Request 129).

RESPONSE: Undisputed.

[redacted]

Dated: November 4, 2020

/s/ Nicole E. Kopinski
Daniel P. Waxman (DW-0599)
BRYAN CAVE LEIGHTON PAISNER LLP
1290 Avenue of the Americas
New York, NY 10104
Telephone: (212) 541-2040
Facsimile: (212) 541-4630
dpwaxman@bryancave.com

Steven H. Sklar (*pro hac vice*)
Maxwell B. Snow (*pro hac vice*)
David M. Airan (*pro hac vice*)
Paul J. Filbin (*pro hac vice*)
Nicole E. Kopinski (*pro hac vice*)
LEYDIG, VOIT & MAYER, LTD.
Two Prudential Plaza, Suite 4900
180 North Stetson Avenue
Chicago, IL 60601
Telephone: (312) 616-5600
Facsimile: (312) 616-5700
ssklar@leydig.com
msnow@leydig.com
dairan@leydig.com
pfilbin@leydig.com
nkopinski@leydig.com

Attorneys for Defendant, Fenix Diamonds LLC